

PERFORMANCE
ON A CANCER KNOWLEDGE TEST

Medical and Osteopathic
STUDENTS

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ANNUALLY since 1949, the majority of the medical students in the United States have taken the Examination for Students of Medicine in the Subject Matter of Cancer, developed and administered by the education proj-

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The education project of the Cancer Research Institute, which conducted the study reported here, is supported by a grant from the National Cancer Institute, Public Health Service.

ect of the Cancer Research Institute at the University of California School of Medicine. In 1952, two osteopathic colleges entered the testing program, and since 1953, all the osteopathic colleges in the Nation have participated. The same test has been administered to both medical and osteopathic students each year, although the test itself has undergone annual revisions.

The examination attempts to evaluate students' knowledge of cancer. It consists of 150 multiple-choice items in which the subject is asked to select the best of 5 alternative responses. The major aspects of the examination have been discussed in previous publications (1-5). Briefly, it covers a representative sampling of all types and locations of tumors and deals with three major aspects of these neoplasms: diagnosis, characteristics, and treatment.

In this paper, we shall consider the relative performance of medical and osteopathic students on this test. All valid tests available from the medical and osteopathic schools for 1953, 1954, and 1955 were studied to determine (a) distributions of individual scores, (b) distributions of school means, and (c) mean percentages of correct responses in the areas of diagnosis, characteristics, and treatment of neoplasms. In addition, test results for the medical students for 1949-55 and for the osteopathic students for 1953-55 were analyzed for an estimate of the increases in mean raw score since the first year of participation in the testing program.

The number of students whose tests were included each year from 1953 through 1955, the major period of the study, are given in the accompanying table.

Individual Scores and School Means

The distribution of the individual raw scores for each medical class and for each osteopathic class each year of the study (freshmen, sophomores, juniors, and seniors, 1953-55) was plotted in frequency polygon form. These distributions are all similar in configuration. In each of the 3 years, the mean score for osteopathic freshmen exceeded the mean score for medical freshmen.

When the means of these distributions are plotted in histogram form, as shown in figure 1, several additional trends are revealed. The data indicate not only that the mean score for the osteopathic freshmen was above the mean score for medical freshmen every year, but also that the magnitude of this difference has increased with each succeeding year. This may be attributable partly to the fact that the osteopathic schools devote considerably more time to

cancer teaching in the freshman year than is customarily the practice in medical schools.

Another notable trend shown in the data in figure 1 is that the differences between the osteopathic and the medical mean scores for the sophomores, juniors, and seniors have gradually decreased since 1953.

Statistical determination of the significance of differences in mean scores between the 4 medical and the 4 osteopathic classes for each of the 3 years was accomplished by means of the critical ratio. In 11 of the 12 comparisons the difference between the mean score of the medical students and the mean score of the osteopathic students was significant well beyond the 1 percent level of confidence. This level of confidence implies that there is less than 1 possibility in 100 that the observed difference is due to chance. In the 12th comparison, that of the 1955 sophomore classes, the difference was significant at the 5 percent level of confidence.

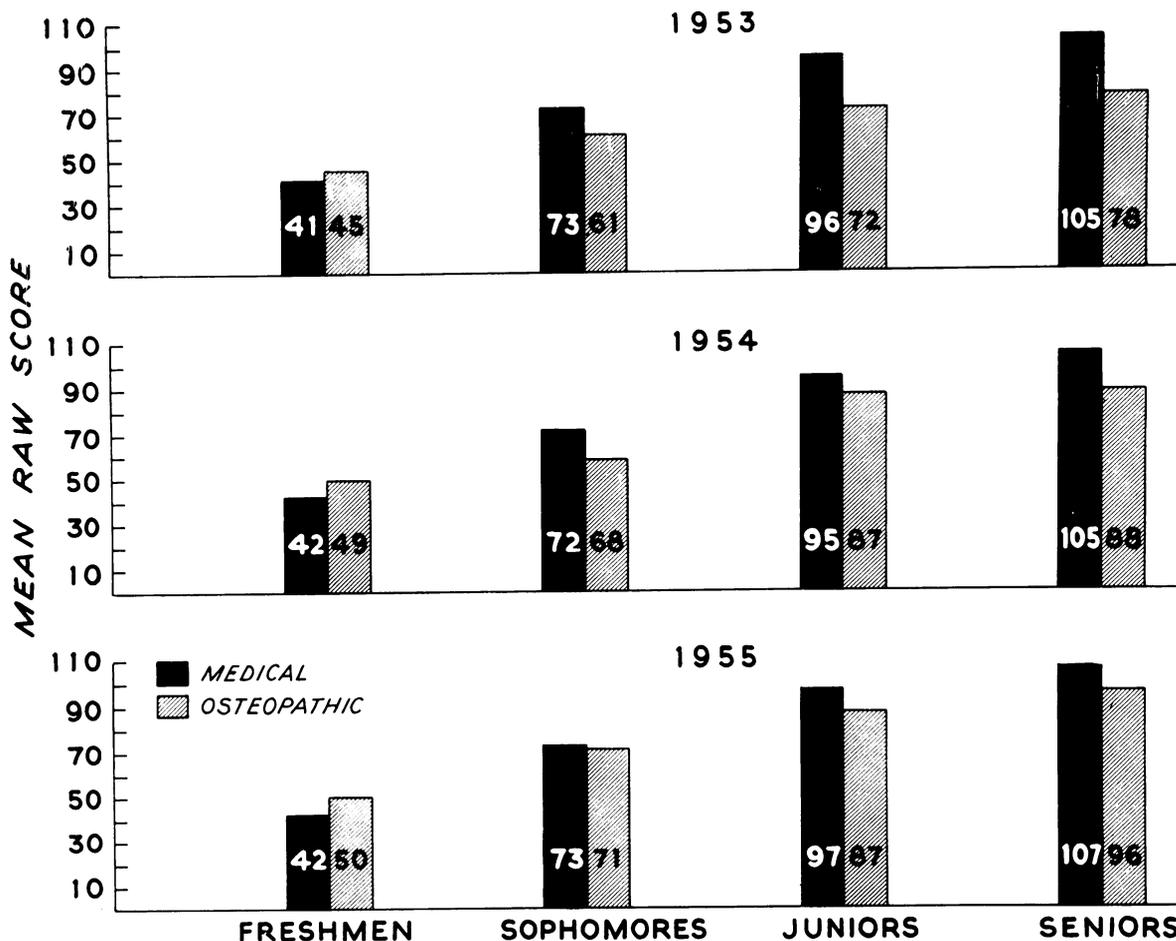
Statistical significance, of course, does not necessarily imply a meaningful difference when the number of individuals involved is very large, as is the case here. It is a matter of judgment as to how many points' difference constitutes educational significance in terms of the students' actual knowledge of the subject matter of cancer. Nevertheless, the educational effort required to overcome this difference with such a large number of students could itself be considered significant.

The distributions of school means for each class each year show trends similar to those of the individual raw scores. The mean scores of the osteopathic schools at the freshman level tend to fall above the mean scores of the medical schools, and the distributions of school means for the upper three classes are similar in shape

Number of medical and osteopathic students taking the cancer knowledge examination, by year

Year	Medical students				Osteopathic students			
	Freshmen	Sophomores	Juniors	Seniors	Freshmen	Sophomores	Juniors	Seniors
1953	4, 713	4, 808	4, 287	3, 727	492	458	447	380
1954	4, 174	4, 191	3, 957	3, 166	363	380	361	294
1955	4, 324	4, 295	3, 904	3, 369	361	345	364	324

Figure 1. Mean raw scores for medical and osteopathic students on the cancer knowledge examination, 1953-1955.



to those of the raw scores. In each of the last three cases, the mean of the medical school means falls above that of the osteopathic school means.

Scores in Specific Areas

The average percentage of correct responses obtained in 1955 by the medical and osteopathic students on items dealing with the diagnosis, characteristics, and treatment of tumors is shown in figure 2. The osteopathic freshmen consistently scored higher than the medical freshmen in each of the three areas, while, with one minor exception (the sophomores in the area of treatment), the osteopathic sophomores, juniors, and seniors scored slightly below the corresponding medical students. Available longitudinal data show increases in percentage

between 1953 and 1955 for all of the areas at all four class levels for both types of schools, although these increases have been somewhat more marked in the osteopathic schools. One might expect to find particularly great differences in the area of treatment, but figure 2 shows that this is not the case. Apparently, the patterns of cancer knowledge of medical and osteopathic students are quite similar.

Comparisons of Initial Gains

The increases in mean raw score since the initial year of participation are of particular interest as measures of the development of the cancer teaching programs in the two types of schools under consideration.

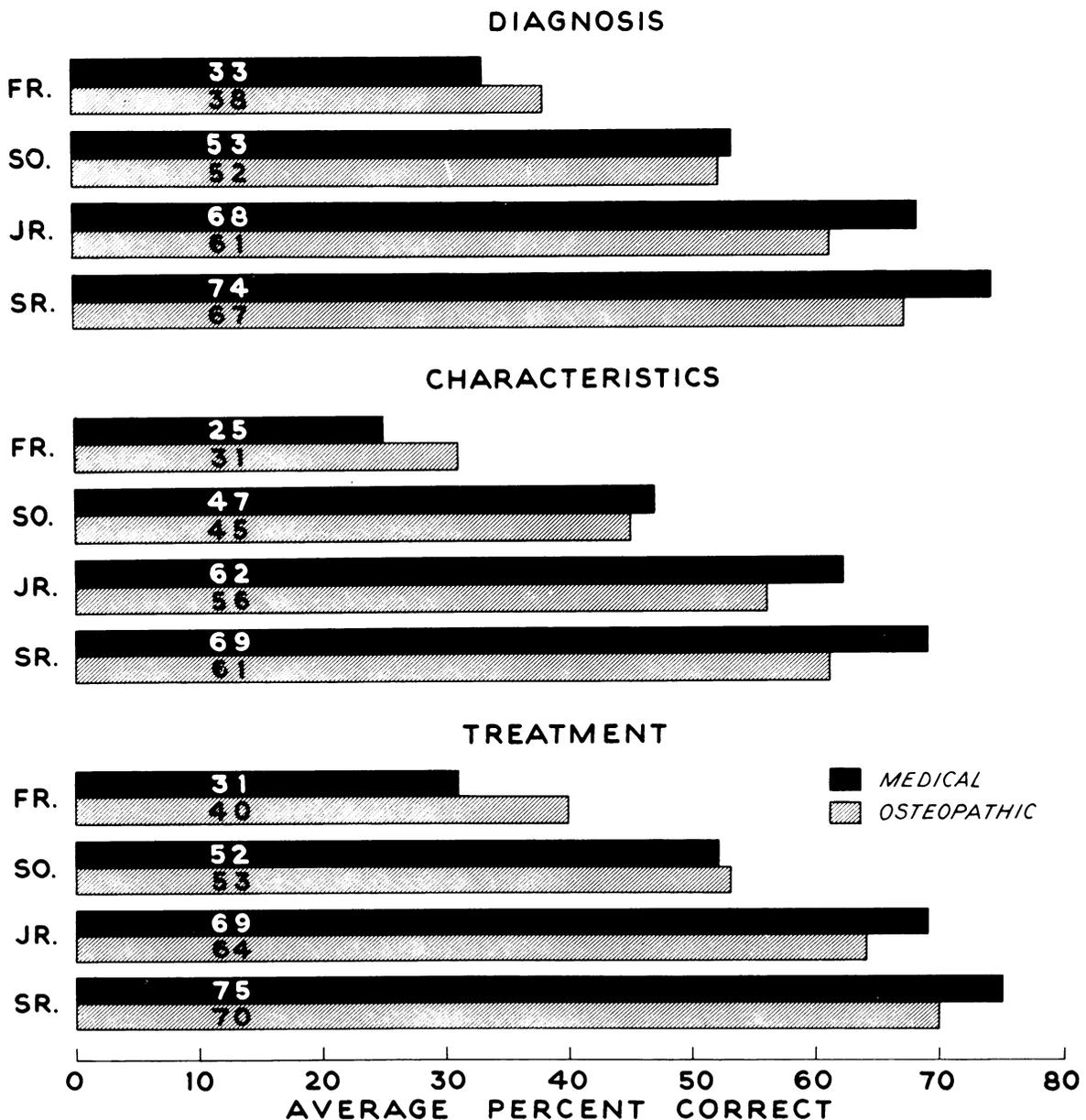
Since 1949, the initial year of participation by medical schools, there has been a steady increase

in the mean scores of the sophomores, juniors, and seniors, while the mean freshmen scores have tended to remain at a constant level. This latter phenomenon is to be expected since there is little reason to believe that freshmen in the medical schools in 1955 knew any more about cancer than did the freshmen in 1949. However, corollary data collected by the education project suggest that there has been a steady improvement in the content and method of cancer

instruction for the upper classes in medical schools.

The teaching of cancer in the osteopathic schools shows similar trends. Since 1953, the osteopathic students' initial year of participation, these students have shown a relatively greater degree of gain than did the medical students during their first 3 years of participation. Both types of schools, however, show evidence of improvement in cancer learning.

Figure 2. Mean percent correct scores for medical and osteopathic students in the areas of diagnosis, characteristics, and treatment on the cancer knowledge examination, 1955.



Summary

From a study of the relative performance of medical and osteopathic students on a test of cancer knowledge, the following major findings are evident:

1. The mean raw score for freshmen students of osteopathic schools exceeded that of freshmen of medical schools for all 3 years, 1953, 1954, and 1955.

2. The mean raw scores of sophomore, junior, and senior students in medical schools exceeded those of the osteopathic students for all 3 years. The magnitude of the difference between the respective classes for the two types of schools, however, has decreased from year to year.

3. In each of the three areas—diagnosis, characteristics, and treatment—the osteopathic freshmen students consistently obtained higher scores than the medical freshmen. At the sophomore, junior, and senior levels, however, the mean percent correct for the medical students exceeded that for the osteopathic students, with one minor exception.

4. All classes in both types of schools have shown increases in the mean score for the areas of diagnosis, characteristics, and treatment of cancer. These increases have been somewhat more marked in the osteopathic schools.

5. Since their initial participation in the cancer testing program, both types of students have shown improvement in cancer learning. The degree of improvement has been somewhat more rapid for the osteopathic students, although their performance during the sophomore, junior, and senior years is still below the performance level of medical students.

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Mental Health Services in Colorado Schools

A 3-day workshop was held recently in Denver on mental health services in Colorado schools. A joint project of the Colorado State Department of Public Health and the State Department of Education, the workshop was supported by a grant from the National Institute of Mental Health, Public Health Service.

Represented at the conference were workers in clinical psychology, psychiatry, social work, school psychology, school administration, public health, and school and public health nursing. Participants came primarily from outlying districts of the State, where there are few mental health services in schools.

The conference defined the roles of professional mental health workers so that their services may be better used by educators to meet everyday school problems. Ideas were developed on the planning of mental health services at the local level, already reflected in concrete planning by some Colorado communities.